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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/765,366	01/27/2004	Sun-hee Kim	YPL-0073	1569

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CANTOR COLBURN, LLP
55 GRIFFIN ROAD SOUTH
BLOOMFIELD, CT 06002

EXAMINER

BERTAGNA, ANGELA MARIE

ART UNIT	PAPER NUMBER
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1637

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	03/27/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No. 10/765,366	Applicant(s) KIM ET AL.	
	Examiner Angela Bertagna	Art Unit 1637	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 16 January 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1 and 4-10 is/are pending in the application.
- 4a) Of the above claim(s) 6-10 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1, 4 and 5 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

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FINAL REJECTION

Status of the Application

1. Applicant's response filed January 16, 2007 is acknowledged. Claims 1 and 4-10 are currently pending. Claims 1 and 4 have been amended, and claims 2-3 have been canceled. Claims 6-10 are withdrawn from consideration as being drawn to a non-elected invention.

Election/Restrictions

2. This application contains claims 6-10 drawn to an invention nonelected with traverse in Paper No. 20060925. A complete reply to the final rejection must include cancellation of nonelected claims or other appropriate action (37 CFR 1.144) See MPEP § 821.01.

Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

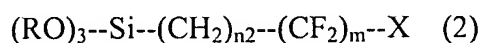
(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

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Claims 1, 4, and 5 are rejected under 35 U.S.C. 102(b) as being anticipated by Veerasamy et al. (US 6,277,480 B1; cited previously) as evidenced by Theil et al. (Journal of Vacuum Science and Technology A (1990) 8(3): 1374-1381; newly cited).

Regarding claim 1, Veerasamy teaches a method of treating a surface of a substrate having silanol groups on the surface and for a biochemical reaction system, the method comprising:

forming a polymer film on the surface by vapor deposition of a compound of formula (1) below and a compound of formula (2) below:



wherein R is one of a methyl group and an ethyl group, X is one of a methyl group and a trifluoromethyl group, n_1 is an integer from 1 to 3, n_2 is an integer from 1 to 10, and m is an integer from 1 to 10 (see abstract where Veerasamy teaches coating a fluoroalkylsilane on a substrate; column 8, lines 42-59 teach specific examples of FAS compounds to be coated on the substrate alone or in combination; $\text{CF}_3(\text{CH}_2)_2\text{Si}(\text{OCH}_3)_3$ (column 8, lines 52-53) is a compound of formula (1) above; $\text{CF}_3(\text{CF}_2)_5(\text{CH}_2)_2\text{Si}(\text{OCH}_2\text{CH}_3)_3$, $\text{CF}_3(\text{CF}_2)_7(\text{CH}_2)_2\text{Si}(\text{OCH}_3)_3$, and $\text{CF}_3(\text{CF}_2)_5(\text{CH}_2)_2\text{Si}(\text{OCH}_3)_3$ (column 8, lines 52-56) are compounds of formula (2) above; column 18, lines 17-21 teach deposition of the FAS compounds by any suitable method; column 9, lines 5-39 teach vapor deposition)

wherein the compound of formula (1) and the compound of formula (2) are simultaneously or sequentially deposited by vaporization (Although Veerasamy does not specify whether the deposition of the compounds occurs simultaneously or sequentially, claim 1 as

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amended only requires that the deposition occur *either* simultaneously or sequentially. It is inherent that compounds taught by Veerasamy are deposited either simultaneously as a pre-mixed composition or sequentially).

Further regarding claim 1, Veerasamy teaches that after deposition using a siloxane gas, the DLC layer (primer layer 4) is a mixture of carbon and silicon and contains carbon-carbon bonds, silicon-oxygen bonds, etc (column 7, lines 15-45). Veerasamy does not teach that the DLC layer also contains silanol (Si-OH) groups. However, as evidenced by Theil et al. (see page 1374, column 1), during the vapor deposition process, silanol groups are inherently formed on the DLC surface. Therefore, the DLC substrate taught by Veerasamy inherently contains silanol groups, and the teachings of Veerasamy anticipate the instant claim 1.

Regarding claim 4, Veerasamy teaches vapor deposition at 70°C (see column 16, line 64 – column 17, line 1; see also column 17, lines 9-11 and column 18, lines 22-30).

Regarding claim 5, Veerasamy teaches that the substrate is made of silicon or glass (column 1, lines 13-18 and column 16, lines 25-26 teach a glass substrate as the base upon which the layers are sequentially coated; column 7, lines 15-45 teach that the DLC layer (layer 4) upon which the FAS compounds (layer 6) are coated includes silicon).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

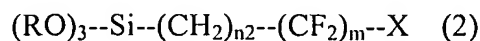
This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1, 4, and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hozumi et al. (Langmuir (1999) 15(22): 7600-7604; cited previously).

Hozumi teaches a method of coating silicon substrates comprising vapor deposition of FAS compounds (see abstract).

Regarding claim 1, Hozumi teaches a method of treating a surface of a substrate having silanol groups on the surface (Hozumi teaches silicon wafer substrates at page 7600, column 2) for a biochemical reaction system, the method comprising:

forming a polymer film on the surface by vapor deposition of a compound of formula (1) below or a compound of formula (2) below:



wherein R is one of a methyl group and an ethyl group, X is one of a methyl group and a trifluoromethyl group, n_1 is an integer from 1 to 3, n_2 is an integer from 1 to 10, and m is an integer from 1 to 10 (see page 7601 where Hozumi teaches coating a fluoroalkylsilane on a

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silicon substrate by vapor deposition; FAS-3, with a chemical formula of $\text{CF}_3(\text{CH}_2)_2\text{Si}(\text{OCH}_3)_3$, is a compound of formula (1), see page 7601; FAS-5 and FAS-7, with chemical formulas of $\text{CF}_3(\text{CF}_2)_5(\text{CH}_2)_2\text{Si}(\text{OCH}_3)_3$ and $\text{CF}_3(\text{CF}_2)_7(\text{CH}_2)_2\text{Si}(\text{OCH}_3)_3$, respectively, are compounds of formula (2), see page 7601).

Regarding claim 4, Hozumi teaches vapor deposition at 100°C (see column 16, line 64 – column 17, line 1; see also column 17, lines 9-11 and column 18, lines 22-30).

Regarding claim 5, Hozumi teaches that the substrate is made of silicon (page 7600, column 1).

Hozumi teaches deposition of one of FAS-3, FAS-5, or FAS-7 on the substrate, rather than a combination of either FAS-3 and FAS-5 or FAS-3 and FAS-7 (see page 7601, column 2).

It would have been prima facie obvious for one of ordinary skill in the art at the time of invention to coat a substrate simultaneously or sequentially with a combination of the FAS compounds taught by Hozumi. MPEP 2144.06 states that, “It is prima facie obvious to combine two compositions each of which is taught by the prior art to be useful for the same purpose, in order to form a third composition to be used for the very same purpose.... [T]he idea of combining them flows logically from their having been individually taught in the prior art.” In re Kerkhoven, 626 F.2d 846, 850, 205 USPQ 1069, 1072 (CCPA 1980).” Since Hozumi expressly taught that the FAS compounds were useful for the same purpose (repelling water, see abstract and page 7601), an ordinary practitioner would have been motivated to coat a substrate with a combination of the compounds (for example, FAS-3 and FAS-5, FAS-3 and FAS-7, or FAS-5 and FAS-7), in order to obtain a water-repellant substrate. Furthermore, it is inherent that when making this “third composition useful for the same purpose”, an ordinary practitioner would

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have applied the two FAS compounds either sequentially or simultaneously to the substrate. Therefore, absent secondary considerations, the methods of claims 1, 4, and 5 are *prima facie* obvious over Hozumi and the MPEP sections cited above.

Response to Arguments

5. Applicant's arguments, see page 5, filed January 16, 2007, with respect to the rejection of claim 4 under 112, 2nd paragraph have been fully considered and are persuasive. Applicant's amendment to claim 4 overcomes the rejection, and therefore, it has been withdrawn.

Applicant's arguments filed January 16, 2007, regarding the rejection of claims 1, 4, and 5 under § 102(b) as anticipated by Veerasamy have been fully considered but they are not persuasive. Applicant argues that Veerasamy does not teach all of the elements of claim 1 as amended (page 6). This argument was not found persuasive, because as discussed in greater detail above, Veerasamy teaches all of the elements of amended claim 1. Veerasamy teaches vapor deposition as a means of depositing the layers on the substrate at column 9, lines 5-59. Also, although Veerasamy does not specify whether the deposition of the compounds occurs simultaneously or sequentially, claim 1 as amended only requires that the deposition occur *either* simultaneously or sequentially. It is inherent that compounds taught by Veerasamy are deposited either simultaneously as a pre-mixed composition or sequentially. Finally, as discussed above, although Veerasamy does not teach that the DLC substrate includes silanol groups, these groups are inherently formed during the deposition process, as evidenced by Theil et al. (page 1374, column 1). Therefore, the teachings of Veerasamy anticipate claim 1.

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Applicant also argues that Veerasamy does not teach all of the elements of claim 5, specifically that the substrate is made of silicon and contains silanol groups (page 6). This argument was not found persuasive, because as noted above, the DLC primer layer 4 of Veerasamy is made of diamond-like carbon and silicon. Veerasamy expressly states, "When HMDSO is used during the deposition process for primer layer 4, either alone or in combination with other gas(es), the resulting primer layer 4 includes DLC, and may be referred to as a DLC inclusive layer that is a hybrid amorphous mixture of DLC and SiO_x that includes sp³ carbon-carbon (C-C) bonds, silicon-oxygen (Si-O) bonds, etc (column 7, lines 21-27)." Furthermore, as evidenced by Theil et al. (page 1374, column 1), the during the deposition process, silanol groups also form on the surface. Since Veerasamy teaches all of the limitations of the instant claims 1, 4, and 5, the rejection under § 102(b) is maintained.

Applicant's arguments with respect to the rejection of claims 2 and 3 under 103(a) as obvious over Veerasamy have been considered but are moot in view of the new ground(s) of rejection. As noted above, claim 1 as amended only requires that the deposition of the two compounds occurs simultaneously *or* sequentially, and this is inherent in the method taught by Veerasamy.

Applicant's arguments filed January 16, 2007, regarding the rejection of claims 1-5 under 103(a) as obvious over Hozumi have been fully considered but they are not persuasive. Applicant argues that Hozumi does not provide motivation to coat the substrate simultaneously or sequentially especially in view of the unexpected results presented in the instant application specification regarding order of deposition (page 10). This argument was not found persuasive because claim 1 as amended only requires sequential or simultaneous deposition. Therefore, the

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central issue in considering the prior art of Hozumi becomes whether or not combining the compounds of formula (1) and formula (2) to form the instantly claimed composition is obvious, because it is inherent that in making such a composition simultaneous or sequential deposition would occur. Regarding formation of a composition comprising compounds of formula (1) and formula (2), as discussed above, MPEP 2144.06 states that, "It is prima facie obvious to combine two compositions each of which is taught by the prior art to be useful for the same purpose, in order to form a third composition to be used for the very same purpose.... [T]he idea of combining them flows logically from their having been individually taught in the prior art." In re Kerkhoven, 626 F.2d 846, 850, 205 USPQ 1069, 1072 (CCPA 1980)." Since Hozumi expressly taught that the FAS compounds were useful for the same purpose (repelling water, see abstract and page 7601), an ordinary practitioner would have been motivated to coat a substrate with a combination of the compounds (for example, FAS-3 and FAS-5, FAS-3 and FAS-7, or FAS-5 and FAS-7), in order to obtain a water-repellant substrate. Therefore, Applicant's arguments regarding the order of deposition are not relevant, because either order of deposition is encompassed by amended claim 1, and combination of two of the FAS compounds taught by Hozumi as suggested by MPEP 2144.06 inherently results in simultaneous or sequential deposition on the substrate. Therefore, the rejection of claims 1, 4, and 5 under 103(a) as obvious over Hozumi is maintained.

Conclusion

No claims are currently allowable.

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Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a).

Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Angela Bertagna whose telephone number is 571-272-8291. The examiner can normally be reached on M-F, 7:30 - 5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gary Benzion can be reached on 571-272-0782. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Angela Bertagna
Examiner, Art Unit 1637
March 19, 2007

amb


JEFFREY FREDMAN
PRIMARY EXAMINER
3/19/07